CLAIM OR CLAIMS

1. A tracking tag for receiving a radio frequency location data signal from an orbiting global positioning satellite and for communicating with a tracking system, the tag being electrically engageable with an external power supply and a battery power supply, the tag comprising:

a) a receiver having an antenna for receiving the location data signal from the global positioning satellite;

b) a customer ID module for generating a unique tag identification signal;

c) a transponder having an antenna for receiving radio frequency command signals from the tracking system;

d) a power circuit for electrically engaging the battery power supply and the external power supply;

e) a programmable microprocessor in electrical communication with the power circuit, receiver, customer ID module, and transponder, the microprocessor being operative to receive the location data signal, the identification signal, the command signals, and to produce a composite output signal contemporaneously representative of tag location, the transponder being further operative to transmit the composite output signal by radio carrier wave to the tracking system.

2. The tag as claimed in Claim 1 additionally comprising a battery power supply, and wherein the power circuit is electrically engaged to the battery power supply.

3. The tag as claimed in Claim 1 wherein the power circuit comprises a power conditioner electrically connected to a receptacle for engaging the external power supply, the power conditioner additionally being

electrically connected to the battery power supply and operative to regulate the power received from the external power supply and the battery power supply for compatibility with the tag.

4. The tag as claimed in Claim 1 wherein the power circuit includes a switch circuit having a first position for engaging the power circuit to the battery power supply and a second position for engaging the power circuit to the external power supply, the microprocessor being further operative to produce a power engagement signal for regulating switching of the switch circuit between the first and second positions.

5. The tag as claimed in Claim 1 wherein the microprocessor is operative to produce enable signals for activating and de-activating the receiver, customer ID module, and transponder.

6. The tag as claimed in Claim 5 wherein the microprocessor additionally comprises a timing circuit for generating an intermittent battery time signal and an intermittent standard time signal, the microprocessor additionally being programmed for bimodal regulation of tag operations such that the tag is regulated in a battery conserving mode in which the receiver, customer ID module, and transponder are activated for receiving the location data signal, receiving the identification signal, and transmitting the output signal in response to the battery time signal when the tag is battery powered, and such that the tag is regulated in an external power mode in which the receiver, the customer ID module, and transponder are activated for receiving the location data signal and the identification signal, producing the output signal, and transmitting the output signal in response to the standard time signal when the tag is powered from the external power supply.

7. The tag as claimed in Claim 6 wherein the timing

circuit generates the battery time signal less frequently than the standard time signal.

8. The tag as claimed in Claim 6 wherein the microprocessor is operative to receive command signals when the transponder is activated.

9. The tag as claimed in Claim 6 wherein the microprocessor is operative to continuously activate the transponder in the external power mode for receiving command signals from the tracking system.

10. The tag as claimed in Claim 6 wherein the microprocessor is operative to receive programming command signals for adjusting the frequency of the battery time signal and the standard time signal.

11. The tag as claimed in Claim 6 wherein the microprocessor is operative to receive programming command signals for switching from the battery conserving mode to the external power mode.

12. The tag as claimed in Claim 6 wherein the microprocessor is operative to receive programming command signals for switching from the external power mode to the battery power mode.

13. The tag as claimed in Claim 6 wherein the microprocessor is operative to receive programming command signals for adjusting the content of the output signal.

14. The tag as claimed in Claim 6 wherein the microprocessor is operative to receive an interrogator command signal for prompting the tag to transmit an output signal.

15. The tag as claimed in claim 1 additionally comprising a plurality of external sensors for transmitting respective ambient data signals to the microprocessor, and wherein the microprocessor is operate to include the ambient data signals in the output signal.

16. The tag as claimed in Claim 1 additionally comprising a battery tester in electrical communication

with the microprocessor and the battery power supply, the battery tester being operative to generate a battery data signal and the microprocessor being operative to receive the battery data signal and to include a battery life data signal in the output signal.

17. The tag as claimed in Claim 1 wherein the output signal is transmitted to a relay satellite for relay to the tracking system.

18. The tag as claimed in Claim 1 wherein the command signals are received from a relay satellite in communication with the tracking system.

19. The tag as claimed in Claim 1 additionally comprising a weatherproof housing, said housing having a front plate connectable to a back plate to form an interior chamber for placement of the tag, said back plate having a first hole for exposing the antenna of the GPS receiver, a second hole for exposing the antenna of the satellite transponder, and a third hole for receiving a receptacle electrically connectable with an external power supply and the external sensors, said housing additionally having an internal support bar connectable with the back plate within the interior chamber for securing the satellite transponder.

20. The tag as claimed in Claim 10 wherein the weather proof housing further comprises a pair of cover plates connectable with the housing for respectively securing the antenna of the receiver and the antenna of the transponder to the housing, the cover plates each having an aperture for respectively exposing the antennas so secured.

21. A method for regulating the operating mode of a tracking tag in response to sensed on-board power conditions, the method comprising the steps of:

a) determining whether the tag is powered by an external power supply;

b) selectively operating the tag in an external

power mode in response to a determination that the tag is powered by the external power supply;

c) selectively operating the tag in a battery conserving mode in response to a determination that the tag is powered by the external power supply.

22. The method of Claim 21 wherein the step of operating the tag in the external power mode comprises the steps of:

i) continuously activating a receiver for receiving a radio frequency location data signal from a global positioning satellite;

ii) continuously activating a transponder for receiving radio frequency command signals from a tracking system;

iii) continuously activating a customer ID module electrically connected to the tag for generating a unique tag identification signal;

iv) collecting the location data signal and the tag identification signal in response to an intermittent standard timer signal from a timing circuit;

v) producing a radio frequency composite output signal contemporaneously representative of tag location for transmission to the tracking system.

23. The method of Claim 21 wherein the step of operating the tag in the battery conserving mode further comprises the steps of:

i) powering the tag from a battery power supply;

ii) intermittently generating a battery time signal from a timing circuit;

iii) activating a receiver in response to the battery time signal for receiving a location data signal from a global positioning

satellite;

iv) activating a customer ID module electrically connected to the tag in response to the battery time signal for generating a unique tag identification signal;

v) collecting the location data signal and the tag identification signal in response to activation of the receiver and the customer ID module;

vi) producing a composite output signal contemporaneously representative of tag location;

vii) activating a transponder for transmitting the composite output signal by radio carrier wave to a tracking system;

viii) disabling the receiver, the customer ID module, and the transponder until a subsequent battery time signal is generated by the timing circuit.

24. The method of Claim 22 wherein the step of operating the tag in the external power mode further includes receiving radio frequency command signals from the tracking system when the tag transmits the output signal to the tracking system.

25. The method of Claim 23 wherein the step of operating the tag in the battery conserving mode further includes receiving radio frequency command signals from the tracking system when the tag transmits the output signal to the tracking system.

26. The method of Claim 22 wherein the step of operating the tag in the external power mode further includes adjusting the time interval between successive standard time signals in response to the command signal from the tracking system.

27. The method of Claim 25 wherein the step of operating the tag in the battery conserving mode further

includes adjusting the time interval between successive battery time signals in response to the command signal from the tracking system.

28. The method of Claim 23 wherein the step of operating the tag in the battery conserving mode further includes switching the tag from the battery conserving mode to the external power mode in response to the command signal from the tracking system.

29. The method of Claim 22 wherein the step of operating the tag in the external power mode further includes switching the tag from the external power mode to the battery conserving mode in response to the command signal from the tracking system.

30. The method of Claim 22 wherein the step of operating the tag in the external power mode further includes collecting the location data signal and the tag identification signal, then transmitting the output signal in response to the command signal from the tracking system.

31. The method of Claim 22 wherein the step of operating the tag in the external power mode further includes obtaining respective ambient data signals from respective ambient sensors in response to the standard time signal, and incorporating the ambient data signals within the output signal transmitted to the tracking system.

32. The method of Claim 23 wherein the step of operating the tag in the battery conserving mode further includes obtaining respective ambient data signals from respective ambient sensors in response to the battery time signal, and incorporating the ambient data signals within the output signal transmitted to the tracking system.

33. The method of Claim 22 wherein the step of operating the tag in the external power mode further includes obtaining a battery data signal from battery tester in response to the standard time signal, and incorporating a battery life data signal within the output

signal transmitted to the tracking system.

34. The method of Claim 23 wherein the step of operating the tag in the battery conserving mode further includes obtaining a battery data signal from a battery tester in response to the battery time signal, and incorporating a battery life data signal within the output signal transmitted to the tracking system.

35. The method of Claim 22 wherein the step of operating the tag in the external power mode further includes adjusting the content of the output signal in response to the command signal from the tracking system.

36. The method of Claim 23 wherein the step of operating the tag in the external power mode further includes adjusting the content of the output signal in response to the command signal from the tracking system.

37. The method of Claim 22 wherein the tag receives the command signals from a relay satellite in communication with the tracking system.

38. The method of Claim 25 wherein the tag receives the command signals from a relay satellite in communication with the tracking system.

39. The method of Claim 22 wherein the tag transmits the output signal to a relay satellite in communication with the tracking system.

40. The method of Claim 23 wherein the tag transmits the output signal to a relay satellite in communication with the tracking system.

41. A method for regulating the operating mode of a tracking tag in response to sensed on-board power conditions, the method comprising the steps of:

a) Determining whether the tag is powered from an external power source;

b) Selectively operating the tag in an external power mode when it is determined that the tag is powered by the external power source, the full power

mode comprising the steps of:

i) continuously activating a receiver for receiving a location data signal from a global positioning satellite;

ii) continuously activating a transponder for receiving radio frequency command signals from a tracking system;

iii) continuously activating a customer ID module electrically connected to the tag for generating a unique tag identification signal;

iv) collecting the location data signal and the tag identification signal in response to an intermittent standard timer signal from a timing circuit;

v) producing a radio frequency composite output signal contemporaneously representative of tag location for transmission to the tracking system.

c) operating the tag in a battery conserving mode when it is determined that the tag is not engaged with the external power supply, the battery mode comprising the steps of:

i) powering the tag from a battery power supply;

ii) continuously activating a receiver for receiving the location data signal from the global positioning satellite;

iii) continuously activating a customer ID module electrically connected to the tag for generating a unique tag identification signal;

iv) continuously activating a transponder for receiving radio frequency command signals from the tracking system by radio carrier wave;

v) collecting the location data signal and the tag identification signal in response to an

intermittent battery time signal from a timing circuit;

vi) producing a radio frequency composite output signal contemporaneously representative of tag location for transmission to the tracking system.

42. The method of Claim 41 wherein the battery time signal is generated less frequently then the standard timer signal.